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Professional Culture of the Specialist of the Future

**HUMANITARIAN SUBJECTS RESOURCE ROLE IN PERSONAL
AND PROFESSIONAL SUCCESS OF INTENDING IT-
SPECIALISTS**

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Abstract

The Study shows the necessity to develop students' universal and metasubject competencies, specifying their future success in the aspects of professional and personal maturity. It is truly stated that formation of the intended professionals' success is one of the basic aims of higher education. Cognitive structure of IT-students "success" concept is characterized by the system of a field subjective and objective signs. Subjects aimed at students' professional and personal self-development as well as at formation of their reflexive self-concept, direct informative and cognitive positions and conceptual framework were generated and implemented from the point of view of psychological fundamentals. Following methods and techniques are used in an empirical part of the article: checklists "My expectations of the course" and "Satisfactions with the course studied monitoring", "Viability test" by S. Maddy, scale "Differential type of reflection" by Leontyev D.A., projective drawing technique "Human in the rain" by Drukarevich M.Z., intellectual (conceptual) abilities analysis "Conceptualization style" (analytical/synthetic characters), "Cognitive scope of the concept", "Subconscious categorization", "Conceptual synthesis" (Kholodnaya M.A.). The following conclusions are made on the basis of the research: such students' intellectual and personal resources as personal and intellectual maturity, self-exploration and self-understanding, direct informative and cognitive position, conception thinking and synthetic cognitive style as well as effective communicative abilities change positively under the influence of humanitarian subjects. These changes are a good basis for IT-students personal and professional success activation.

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1. Introduction

Modern society requires the professionals who are able to solve any problems effectively. Nowadays professional is a person who has restricted professional skills (i.e., hard skills) as well as universal skills (soft skills). These skills are urgently imperative and important in the sphere of Engineering and IT spheres. Modern IT companies are aimed at forming teams of high-skilled professionals who are able to make their company successful on the competitive market. These abilities are directly connected with programming skills of specialists (software development, system integration, etc.) as well as with their personal qualities, such as creativity, ability to solve different complexity degree problems, work in a team (having increased social intelligence) (Dawson & Thomson, 2018), being responsible and ready to make decisions, being able to control themselves (self-regulatory function) and their free-time, etc. All these qualities provide personal and professional success of the separate person (IT-specialist) as well as the success in business (company, corporate) development in general. Until quite recently (very beginning of the 21st century) Russian education was not aimed at developing IT-specialists universal communication and integrative skills. However nowadays situation is profoundly changing which is exemplified by the modern educational standards. These standards include necessity to develop universal and metasubject competences which will bring specialists to success in their professional sphere as well as in their personal, social and psychological maturity.

2. Problem Statement

Personal success is a highly demanded quality in modern social conditions, it is identified by many variables: from objective historical to subjective psychological ones. It is evident that the most important factors, defining personal success, are subjective psychological ones, including all intellectual and personal resources as a unified integrative system, providing psychological stability and resistance to disadvantaged or rough conditions, personal development and self-improvement in all the spheres of life. I.e., the success of a person, being a subject of life, beginning with the process of anticipation and finishing with the process of constructing, is one of the individual future predictors (Eksakusto & Kibal'chenko, 2017). Consequently, forming success (personal and professional) is one of the most important aims of the modern educational system.

3. Research Questions

Nowadays we can find lots of articles and works defining the notion of personal and professional success. Having analyzed those works we may point out the following features of success:

- 1) it is characterized by a clear semantic space including objective signs such as work, family, health, education, etc., subjective ones such as singlemindedness, sociability, will activity, etc., as well as existential signs: self-actuating, self-fulfillment, self-sufficiency, etc., (Androsenko, 2013); however, subject-matter of success notion is defined by such factors as emotional capability, status value/notability, dynamism and rate (Kishtimova, 2013);
- 2) it includes such personal qualities as communication ability, ability to correlate own wishes and prospects; self-confidence, importance and value of trust; professionalism, ability to unlock own

potential and to approve oneself; aptitude to plan and to estimate the result of own activity from the perspective of correct events evaluation (Thompson, 2004);

- 3) it also has an influence on individuality formation in general as well as on formation of personal attitudes, self-identification, aspiration level, motivation in particular; these factors are included into a notion of the personal success (however, a reverse influence of the abovementioned variables can be observed in a process of success notion representation system forming) (Low, Overall, Hammond, & Girme, 2016);
- 4) success gives an impetus to person's definite professional activity, making person pay attention to the objects important for this activity and life in general; has an influence on choosing favourable and realistic behavioral pattern and vary depending on social experience and person's reaction on social conditions (this is an identifying factor of professional success) (Shcherbakova, Tamaskhanova, & Klad'ko, 2015);
- 5) it comes across as the result of definite activity and labour and correlates with an intellectual and personal resource structure. This fact helps us to mark out cognitive and semantic, regulative and intentional aspects of the "success" concept intension as well as an additional emotional and evaluative category. As the result we are able to define the signs of person's being embedded into the process of individual success formation and emotionally significant results of this process (Eksakusto & Kibal'chenko, 2017).

Sum up, it may be said that person's success is determined by the intellectual and personal resources unity and sustainability. In this case person attaches resource importance to his current and future experience, appraises it as being meaningful, valuable and significant, person shows an aspiration and ability to define and structure personal resources during different experience forms activation and integration (Lavrik, 2014).

Intellectual and personal resources become activate and start to work in situations and conditions playing resource role for person, i.e. they are meaningful for an individual. That is why educational conditions (including educational programs content, methods of proficiency estimation) play a great role in activating students' current and future abilities as well as in improving their personal resources being a direct function of students' instrumental (internal) skills (Leontyev, 2016; Alexandrova, Lebedeva, & Bobozhej, 2014).

Students' instrumental skills (general social and general professional ones) are very important for their capability with external resources (studying). These skills build on students' success. Within this framework, students are to be helped and supported in realizing the necessary and typical reasons of self-development and self-actualization. It becomes possible thanks to humanitarian educational paradigm based on:

- individual orientation of education taking into account student's personal psychologic peculiarities;
- providing students with useful facilities necessary for their self- and skills development, giving them freedom of choice so that they may use their intellectual and personal resources ad maximum;

- teachers and students' innovative approach to educational process, interpersonal communication, dialogue, supporting self-education.

Humanitarian subjects are to be included into corresponding curriculum. These subjects are connected with Psychology of communication and interaction as well as with creativity development and meeting project challenges, self- and time-management, efficient use of personal resources, etc.; psychological methods are to be included into proficiency estimating tools. Furthermore, it is important to control all the factors, methods, techniques, communication styles, etc., impact on the competences formation level.

This paradigm is widely spreading nowadays all around the educational establishments in Russia as well as in foreign countries. It should be mentioned that modern higher education (all over the world) is focused on educational process enhancement based on multicultural competences. This factor is very important for having success on labour market in the 21st century (Kazin, Lutsenko, Makarchenko, & Zlenko, 2015; Bartolomé, Castañeda, & Adell, 2018). Professionals working in leading higher education establishments all over the world try to intensify teaching the major subject by adding social and humanitarian subjects as well as information and communications technologies (ICTs). First of all, these subjects and technologies are purposed to form individuality, develop proactive approach of life, to get practical skills necessary for having personal and professional success (Zakaria, 2015; Dziuban, Graham, Moskal, Norberg, & Sicilia, 2018). From this perspective, social and humanitarian subjects have become one of the most valuable instruments for engineer-specialists socialization and becoming persons with well-developed multicultural and professional competences, communicative and adaptation abilities (Kazin, Lutsenko, Makarchenko, & Zlenko, 2015). Such universities as Massachusetts Institute of Technology (MIT), California Institute of Technology (Caltech), Korea Advanced Institute of Science and Technology (KAIST), Technical University of Munich (TUM), Swiss Federal Institute of Technology Zurich (ETH Zurich), Spanish universities, etc., focus on training multi-skilled specialists with critical thinking, having qualities of leader and manager in addition to being professional in major subject (Ferrés, Masanet, & Mateus, 2018; Armengol & Stojanovic, 2013). Success depends on self-comprehension, aspiration level and motivation (Low, Overall, Hammond, & Girme, 2016), that is why teachers have to pay attention to human resources and students' gaining experience during educational process (Zakaria, 2015) and being able to use it in their professional activity, obtain success and to have a proactive approach of life.

4. Purpose of the Study

Humanitarian education has become a leading paradigm in the most of World higher educational establishments. It has also become particularly important for IT-specialists training (this profession is specific enough from the point of view of social and personal skills, that is why special emphasis is to be made on the educational program). According to this, the research is aimed at studying peculiarities of IT-students intellectual and personal resources in conditions of their studying humanitarian subjects. It may be assumed that correct compilation of humanitarian subjects from the point of view of psycho-didactic approach (i.e. syllabus, teaching forms and methods are based on psychological, didactic, methodological and domain knowledge taking into account common psychological factors of personality development)

can ensure correct metasubject (general social and general professional) skills or soft skills forming. Intellectual and personal resources integration is taken as the key indicator of the process mentioned above and is possible in case of:

- including “Psychology of personal resources management”, “Psychology of professional self-development”, “Psychology of effective intercommunication and group communication and cooperation”, “Psychology of business and interpersonal communications”, etc., into training program;
- using interactive technologies, methods and techniques: elements of social and psychological training, business and role plays, case technologies, modelling and projects technologies, Science Slam, etc.
- using the technique of a reflexive self-esteem as a component of an intellectual and personal resource (that provides students development according to a formula: experience plus post-experience reflection is development) (Hamdan, 2017).
- including the technique of studying and developing conceptual (semantic) structures into training program; this technique provides the ability of scientific terms to be analyzed theoretically and synthesized conceptually; concepts cognitive structure included into intellectual resources may be advanced in this case;
- using paradoxical, “impossible” (Kholodnaya & Khazova, 2017) information making students able to reflect in the mode of the events variable analysis, to have an open cognitive position included into intellectual resources.

This educational paradigm is used in Southern Federal University (SFU) at the Institute of computer technologies and information security (ICTIS). It should be noted that all the elements and technologies of this educational paradigm listed above are used while teaching students humanitarian subjects in all IT-specialists training programs. To prove this hypothesis let us analyze the data obtained from students and undergraduates.

5. Research Methods

Such methods and techniques as checklists “My expectations of the course” and “Satisfactions with the course studied monitoring”, personal, social and psychological features diagnostics (“Viability test” by S. Maddy (Hardiness Survey, Salvatore R. Maddi), scale “Differential type of reflection” by Leontyev, projective drawing technique “Human in the rain” by Drukarevich), intellectual (conceptual) abilities analysis “Conceptualization style” (analytical/synthetical characters), “Cognitive scope of the concept”, “Subconscious categorization”, “Conceptual synthesis” (Kholodnaya), etc., are used for detecting and analyzing the changes in intellectual and personal development of students and undergraduates (n = 207).

6. Findings

It is to be emphasized that by results of exploratory questionnaire (carried out on the first lesson and included such questions as "What do I expect from a course what I would like to learn about?",

"What questions in communication, interaction, self-organization, etc. are especially interesting to me?", "I hope...", "I am afraid of...", etc.) the statistics of indices distribution is always approximately identical. For about 27% of students show negative attitude to subjects, assuming that the information connected with humanitarian studies will be boring for them (e.g. "I am interested in programming, I don't acquire psychological and philosophical information...", "I am not interested in these problems since I know everything ...", "I expect nothing from the course ...", etc.). Nearly half of students/undergraduates (48%) show their open cognitive position, interest in some peculiar subjects and problems during exploratory questionnaire (as a rule, these problems are connected with building relations with other people, intercommunication, becoming self-assured, not being afraid of public speaking, etc.). 25% of students showed their indifference to subjects (e.g., "I don't know what I would like to learn about", "I expect anything the teacher may tell", "I hope that the information will be interesting", etc.). This attitude, on the one hand, can demonstrate students being passive, but, on the other hand, it shows their closed cognitive position.

Moreover 42% of students have an external (positive or negative) motivation for studying the course: "I hope that I will pass / will get a good mark", "I hope that I will fulfill the program requirements", "I hope that the teacher will be tolerant and positive-minded towards me", etc.

If speaking about primary testing students' personal, social and psychological peculiarities we may conclude as follows: the results of resilience studying showed that its consolidated figure is characterized by average value (83,1); 9% of students have low level and about 13% - high one. Average value of resilience helped to find out average, even tending to low values of students mindful involvement (35,7 points: at about 26% of students are characterized by the low involvement; i.e. they feel rejection of social realm, feel like being "out of" life) as well as rather high rate of risk-taking (18,2 points: 37% of students are characterized by being confirmed that all the situations happening in their lives help them to develop thanks to knowledge and experience got from these situations; these students consider life as a way of experience gaining, they are ready to act at their own risk, consider aspiration to simple comfort and safety as factor making life unpleasant and "poor"). As a result about one third of students are prone to passivity, characterized by the reduced social activity and are inclined to risk and act impulsively (this fact may be explained by age peculiarities).

Most of students (about 72%) are characterized by an average, even tending to low reflection (35,4 points) and introspection (24,56 points) levels. They have an ability to self-distancing and introspection, are concentrated on their own state and experiences based on a high quasireflexion (29,71 points); visionary for these students is an element of psychological defense in case of unpleasant life situations (28% of students). These data are confirmed by the results of projective drawing test. 35% of undergraduates show tendency to mental escape, loss of "direction" in life; they have such protective mechanisms as visionary, unwarranted excessive optimism. But 45% (!!!) of them consider themselves to be some kind of unrecognized geniuses.

18% of students have low self-esteem, feel insecure and despondent; these students are not interested in their social status and are afraid of self-presentation. They do hesitate to show their feelings and tend to be reserved and mentally blocked while interacting with other people. At the same time 50% of them have even depressive feelings. 10% of students show tendency to schizoid position (isolation

from reality, self-absorption, unwillingness or even inability to get in contact with people), these factors reduce the students' communication need. But this kind of accentuation has positive aspects: it helps person to venture outside the box; to be effective in inventive and research activity which is very useful in the IT-specialists career.

Only 19% of students are characterized by resilience, mass activity, uptaking difficulties as a temporary phenomenon, showing ability to adapt to the assigned tasks. These students are psychologically healthy, independent, integrative and mature.

We use various technologies aimed at developing intellectual skills and personal abilities of students while teaching them humanitarian subjects. These technologies include social and psychological trainings which are the most favourable for students. Such techniques as group interaction and communication ("Pass in a post card", "Bus-stop", "Confusion", "Important information", etc.) allow students to realize and brush up on their skills of effective communication (verbal and nonverbal).

Test cases (e.g. literary works snippets and characters are taken as examples; the students are to describe and analyze their personal characteristics and peculiarities, social and perceptive processes manifested in a process of communication and having an impact on their being successful/unsuccessful in life and profession) as well as business role-playing games ("Towers from papers", "Disaster in a desert", "Figures from matches") are also very important for students personal development. The tests and games mentioned above are used to practice leadership abilities and group decisions making, etc.

Personal peculiarities repeated testing is performed at the end of the educational course. The results of this testing do not differ significantly from the primary testing, it is explained by the short period of course teaching (1 or 2 times a week during one semester). The repeated testing consists of writing an essay including students' self-diagnostics and their professional, personal and interpersonal relations and communication features reflection. Even this stage shows that the students are apt to adequate self-acceptance and introspection, they show their personal maturity and mindfulness (e.g., one of the students used such phrases as "thanks to this course I understood what I need in my life, I found the reason for studying at Master's degree program...I have a sense of purpose...I need external resources as well as internal ones to reach the goal..."). This result is a remarkable example of student's self-improvement, self-awareness. Most of the students realized that they have to make attempts to develop themselves. It takes time and patience. The most difficult step is the first one. Some of them could clearly state that communicating with others is difficult for them, they feel shy and lack of income security in dealing with other people, but at the end of course they realized that everything can be changed.

The methods of reflexive self-esteem are used during our course as a part of an intellectual and personal resource. First of all students were offered to analyze and estimate the results of their project activities. Then they had to compare teachers and their own analyses results and to make conclusions. We suggested estimating the ability of students to plan and predict the results of their project activities. The students were neither able to define a problem at the scientific level nor to prove the urgency of their own projects at the beginning of the course. Then came students dialogues, polylogue and discussion of the ideas of their projects with the teacher. The students made conclusions about incompleteness of their knowledge, contradictions in the cause-and-effect relationships, in teacher assessment and their own estimation of the projects. Most of the students (55%) had problematic prereflexive (non-confrontational)

self-esteem at the beginning of semester. These results were determined while analyzing students' reports, in which they declared their attitude towards the received results in individual and group discussions. The second stage (the end of a semester) showed that prereflexive self-esteem is superseded by reflexive one ($\phi^*_{emp} = 2,461$ in case if $p \leq 0,01$). This is the proof of students being ready for self-knowledge and their own activity reasonable estimating.

Educational process is also focused on conceptual (semantic) structures studying and developing as well as on forming students' ability to analyze the new scientific terms theoretically and synthesize them conceptually. The aim is to add more insight to the cognition of the notions object field. First of all (at the beginning of a semester) the students had to take diagnostic tasks (the so called "subtests") including such super subject categories as "time", "information", "channel", etc., as stimulus materials. They were to define peculiar signs characteristic of each category, to learn the definition and explanation of essential and secondary (insignificant) signs, to group them, etc. The next training stage consisted of marking out the key category of the object field studied and using it for further modalities constructing and classification, concepts grouping. There was one category called "information" analyzed by all the students. The third stage: the students passed a test based on the abovementioned subtests in object field studied, but the stimulus material has been changed. The categories ("cryptography", "algorithm", "project", "fuzzy logic", "logic argument", "resource", "databases") were offered by the students.

The analysis of the received assessment results (based on two tests) showed positive changes in conceptual structures indices:

- quantity of the offered subject concepts (8 and 33);
- number of groups of concepts (3 and 7);
- amount of signs of the concept cognitive structure (9 and 34);
- quantity of the constructed modalities (4 and 8);
- quantity of the modalities improving the concept content (1 and 5);
- quantity of the modalities aggravating the concept content (4 and 1).

The results were compared on the basis of Wilcoxon's T-criterion to define reliable positive and negative changes and the effect of the tasks offered ($T_{emp} = 1$, in case if $p \leq 0,05$). The result obtained demonstrates truthfulness of the positive changes in diagnostic indices and concepts structure cognitive complexity. Content analysis showed that students offered such categories as "the concepts improving the concept content", "the concepts aggravating the concept content", "matching the definition" at the beginning of the course. These categories are characterized by the lack of the categories differentiation. But at the end of studying they showed higher level of conceptual thinking in educational activity:

- the groups of operations, algorithms, procedures, methods, functions, processes signifying different category aspects were chosen from the list offered by the students;
- categorical abilities aimed at clustering the words from one conceptual object field were demonstrated during the course;
- the students brought different words from one conceptual field to correlation by implication (complex strong links), and showed their ability to create semantic context (e.g. such categories as "code, unit, structure" are connected into the following semantic phrase: "The code has a replacement unit and a structure of Feistel network"; "information, channel, algorithm" – into

following semantic phrase: “Information transfer through open channels is carried out by means of RSA algorithm”).

The changes in analytical/synthetical characteristics of cognitive styles were found out in the research: the students began to learn specific stimuli while studying concepts; they also tried to perceive separate stimuli (having common features) as an integral unit. At the end of the course the students were characterized by specific cognitive behavior: they were ready to accept paradoxical information, unusual data positively and to find creative solutions (Table 01).

Table 01. The results of students’ cognitive style and cognitive position changing (before and after working with conceptual frameworks while studying the “Psychology of personal resources management” course).

	Cognitive style analytical/synthetical characteristics	Open cognitive position (%)	Neutral cognitive position (%)	Closed cognitive position (%)
Before the experiment	61% / 39%	19%	45%	36%
After the experiment	42% / 58%	52%	29%	19%
Differences in Fisher (angular) transformation criterion	$\varphi^*_{emp} = 2,82$, $p \leq 0,01$ (significant difference)	$\varphi^*_{emp} = 4,94$, $p \leq 0,01$ (significant difference)	$\varphi^*_{emp} = 2,332$, $p \leq 0,01$ (significant difference)	$\varphi^*_{emp} = 2,677$, $p \leq 0,01$ (significant difference)

7. Conclusion

On the basis of the diagnostics and tests results content analysis from the point of view of students being satisfied/not satisfied with the course studied, we can make following conclusions:

- students can be characterized by the higher level of personal and intellectual maturity derived from positive reflection, mindfulness, self-esteem, self-confidence, emotional intelligence indices dynamics; they are more motivated in studying and professional activity;
- students report on their effective communication skills developing (including non-verbal communication skills): socially significant contacts strengthening, ability to make their communication more effective and successful;
- they have become much more cognizant of self-exploration and self-comprehension: abilities to value and plan their activity resulting character, to choose vital aims with their eyes open as well as to define the prospects for their development and possibilities for approve and manifest themselves;
- students demonstrate higher level of conceptual thinking while studying notions object fields, open cognitive position and synthetical cognitive style prevail in this case.

We would like to end with noting that finally IT-students were highly satisfied with the humanitarian courses studying (9,5 of 10 points), they declared that practical training has resulted on their realizing the problems connected with their personal and professional development as well as with their ability to establish close friendly and strong relations, mutual understanding in their groups and ability to work together for high-quality and fast solving the problems. The students have a clear understanding of

their opportunities, aspiration level, dominating vital aims. This factor is an indicator and determinator of students personalities success (professional and personal) as a result of their well-directed efforts, activity and personal involvement in the process of their efficiency increasing and significant results getting. Thus, intellectual and personal resources development as well as their unity and integrity predict their integration into a new stature resource that can be useful for subjects personal and professional development success.

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